WHAT IS CLAIMED IS:

1. A method for determining total leakage power for an integrated circuit (IC) having a plurality of circuit macros, comprising the steps of:

a) estimating a present total macro power for each of said plurality of circuit macros;

b) calculating a macro temperature for each of said plurality of circuit macros in response to said present total macro power using a multi-dimensional thermal model for a thermal structure for removing heat from said IC;

c) calculating a macro voltage for each of said plurality of circuit macros in response to a current drawn by each of said macros using a multi-dimensional electrical model for a power distribution structure for delivering power from a power supply to said IC, wherein a value of said current is set as a function of said total macro power;

d) calculating a present leakage power for each of said circuit macros in response to a corresponding macro temperature and macro voltage;

e) calculating a present dynamic power for each of said plurality of said circuit macros in response to a corresponding macro temperature and macro voltage;

f) calculating said present total macro power for each of said plurality of circuit macros in response to said present leakage power and said present dynamic power; and

g) repeating steps b) through f) if said present leakage power has not converged to a final leakage power and stopping if said present leakage power has converged to said final leakage power for each of said plurality of circuit macros.

2. The method of claim 1 further comprising the step of adding said total macro power of each of said circuit macros generating said total leakage power.

3. The method of claim 1 wherein a macro voltage at each of said plurality of circuit macros is set to a nominal voltage during the step of estimating said total macro power.

4. The method of claim 1, wherein said current through said power distribution network has a value corresponding to said present total macro power divided by said macro voltage.

5. The method of claim 1, wherein said multi-dimensional power distribution model comprises a grid network having a multiplicity of circuit nodes coupled together with said resistor.

6. The method of claim 5, wherein said multi-dimensional power distribution network comprises three spatial dimensions.

7. The method of claim 1, wherein said multi-dimensional thermal model for removing heat from said IC comprises a thermal model for said IC, a thermal model for thermally coupling said IC to a corresponding electronic packaging and a thermal model for thermally coupling said IC to a corresponding heat sink.

8. The method of claim 7, wherein said thermal model for said IC, said thermal model for thermally coupling said IC to a corresponding electronic packaging, and said thermal model for thermally coupling said IC to a corresponding heat sink, wherein each model comprises a grid network having a multiplicity of nodes coupled together with thermal resistor elements.

9. The method of claim 1, wherein said macro temperature for each of said plurality of circuit macros is calculated using a linear solver to solve sets of equations defining said multi-dimensional thermal model.

10. The method of claim 1, wherein said macro voltage for each of said plurality of circuit macros is calculated using a linear solver to solve sets of equations defining said multi-dimensional power distribution network.

11. The method of claim 1, wherein said present leakage power for each of said plurality of circuit macros is calculated using a circuit analysis program having data relating leakage power as a function of process parameters, power supply voltage, circuit configurations, temperature, and logic states.

12. A computer program product for determining leakage power for an integrated circuit (IC) having a plurality of circuit macros, said computer program product embodied in a machine readable medium, including programming for a processor, said computer program comprising a program of instructions for performing the program steps of:

a) receiving an estimated present total macro power for each of said plurality of circuit macros;

b) calculating a macro temperature for each of said plurality of circuit macros in response to said present total macro power using a multi-dimensional thermal model for a thermal structure for removing heat from said IC;

c) calculating a macro voltage for each of said plurality of circuit macros in response to a current drawn by each of said macros using a multi-dimensional electrical model for a power distribution structure for delivering power from a power supply to said IC, wherein a value of said current is set as a function of said total macro power;

d) calculating a present leakage power for each of said circuit macros in response to a corresponding macro temperature and macro voltage;

e) calculating a present dynamic power for each of said plurality of said circuit macros in response to a corresponding macro temperature and macro voltage;

f) calculating said present total macro power for each of said plurality of circuit macros in response to said present leakage power and said present dynamic power; and

g) repeating steps b) through f) if said present leakage power has not converged to a final leakage power and stopping if said present leakage power has converged to said final leakage power for each of said plurality of circuit macros.

13. The computer program product of claim 12 further comprising the step of adding said total macro power of each of said circuit macros generating said total leakage power.

14. The computer program product of claim 12 wherein a macro voltage at each of said plurality of circuit macros is set to a nominal voltage during the step of estimating said total macro power.

15. The computer program product of claim 12, wherein said current through said power distribution network has a value corresponding to said present total macro power divided by said macro voltage.

16. The computer program product of claim 12, wherein said multi-dimensional power distribution model comprises a grid network having a multiplicity of circuit nodes coupled together with said resistor.

17. The computer program product of claim 16, wherein said multi-dimensional power distribution network comprises three spatial dimensions.

18. The computer program product of claim 12, wherein said multi-dimensional thermal model for removing heat from said IC comprises a thermal model for said IC, a thermal model for thermally coupling said IC to a corresponding electronic packaging and a thermal model for thermally coupling said IC to a corresponding heat sink.

19. The computer program product of claim 18, wherein said thermal model for said IC, said thermal model for thermally coupling said IC to a corresponding

electronic packaging, and said thermal model for thermally coupling said IC to a corresponding heat sink, wherein each model comprises a grid network having a multiplicity of nodes coupled together with thermal resistor elements.

20. The computer program product of claim 12, wherein said macro temperature for each of said plurality of circuit macros is calculated using a linear solver to solve sets of equations defining said multi-dimensional thermal model.

21. The computer program product of claim 12, wherein said macro voltage for each of said plurality of circuit macros is calculated using a linear solver to solve sets of equations defining said multi-dimensional power distribution network.

22. The computer program product of claim 12, wherein said present leakage power for each of said plurality of circuit macros is calculated using a circuit analysis program having data relating leakage power as a function of process parameters, power supply voltage, circuit configurations, temperature, and logic states.